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Quantum Phases of the Shastry-Sutherland Kondo Lattice JEDEDIAH PIXLEY, RONG YU, QIMIAO SI, Rice University — Motivated by the discovery of the geometrically frustrated heavy fermion metal Yb2Pt2Pb[1], which has a quasi two dimensional Shastry-Sutherland lattice structure, we consider the Heisenberg-Kondo lattice model on a two dimensional Shastry-Sutherland geometry. Using a large-N method, we obtain the phase diagram and, in particular, the quantum transitions between a valence bond solid phase and a heavy Fermi liquid phase. Interestingly, we find intermediate states that break the C4 symmetry. We discuss the implications of our results for the experiments on Yb2Pt2Pb and related 221 materials [1], as well as the possible placement of these systems in a proposed global phase diagram for heavy fermion metals [2]. [1] M. S. Kim and M. C. Aronson, arXiv:1202.0220 (2012). [2] Q. Si, Phys. Status Solidi B 247, 476-484 (2010).

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